JUNE 1988

MINING ENGINEERING

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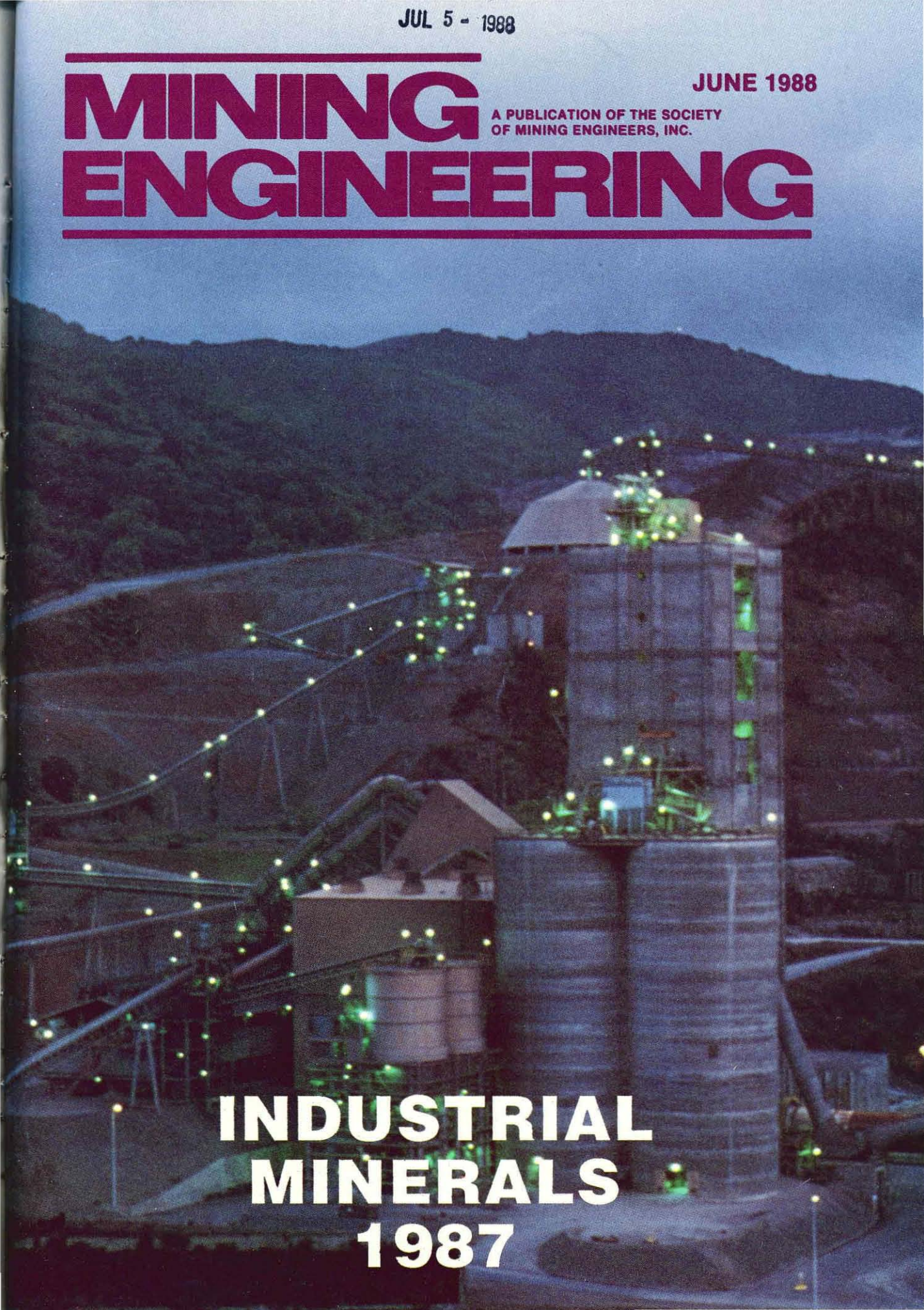

INDUSTRIAL MINERALS 1987

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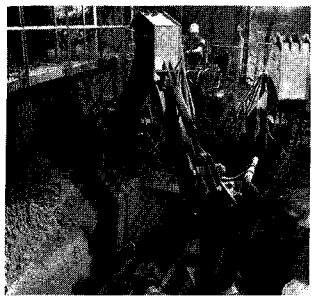
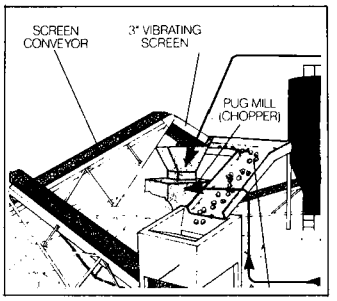


Page 407



Page 447

Page 467

Page 467

DEPARTMENTS

Cover photo is of the Kaiser Cement Corp. Permanente plant near San Jose, CA. The review of 1987 industrial minerals activity begins on page 415.

415 1987 INDUSTRIAL MINERALS REVIEW

TECHNICAL PAPERS

Iodine

P.A. Lyday
US Bureau of Mines

Three companies in Oklahoma had nameplate capacity to produce more than half of reported domestic iodine demand. Imports of crude iodine amounted to 1.1 kt (2.5 million lbs) with a c.i.f. value of $17.6 million.

Imports of resublimed iodine, 99.9% pure, amounted to 2 kt (4.4 million lbs) with a c.i.f. value of $31 million. The average c.i.f. value of imported crude iodine was $15.37/kg ($6.92 per lb) and that of resublimed iodine was $15.70/kg ($7.06 per lb).

Woodward Iodine continued production from underground brines associated with small amounts of natural gas in Woodward County, OK. North American Brine Resources operated two miniplants that produced iodine from waste brine associated with crude oil production in Kingfisher County, OK.

In October, a new plant was completed in Dewey County, OK by Iochem Corp., a Japanese-owned company. Nameplate capacity was announced as being 453 t/a (1 million lb per year). Actual production, however, will depend on the quality and quantity of the brines.

Iochem bought 16 km^2 (4000 acres) of brine leases. Iochem was in the process of drilling 3050 m (10,000 ft) deep supply and reinjection wells. The plant will employ 25 people and be one of the area's largest employers.

Iodine is a strategic material in the US National Defense Stockpile. During 1987, 277 t (610,000 lbs) was released as payment material for upgrading contracts for stockpiled ferroalloys. The iodine payment was completed in April, and authorization for additional material was unavailable.

The stockpile goal remained at 2.6 kt (5.8 million lbs). Total inventory at year-end was 3 kt (6.6 million lbs) valued at $52.9 million.

The primary uses for iodine were animal feed supplements, catalysts, inks and colorants, pharmaceuticals, photographic equipment, sanitary and industrial disinfectants, and stabilizers.

Iodine can be used over a wide range of pH values to form a stable complex to dissolve gold by leaching. Iodine can be regenerated by using ion exchange and electrolytical processes. The process, though, is expensive.

Japan continued to be the major world producer of iodine as a byproduct of natural gas production. Seven companies operated 17 plants in Chiba, Miyazaki, and Niigata Prefectures. They produced an estimated 7.2 kt (16 million lbs). Chile, the second largest producer, reported production of 3.2 kt (7 million lbs) as a byproduct of nitrate production from caliche in the Atacama Desert. ■

Kyanite

M.J. Potter,
US Bureau of Mines

Kyanite, andalusite, and sillimanite are anhydrous aluminum silicate minerals that have the same chemical formula, $Al_2O_3 SiO_2$. Related materials include synthetic mullite, dumortierite, and topaz — also classified as aluminum silicates.

Calcination of kyanite group minerals yields the refractory material mullite. Synthetic mullite is made by heating mixtures of kaolin and bauxite or silica sand and alumina at high temperatures. All of the kyanite group substances can serve as raw materials for manufacturing high performance, high alumina refractories.

Kyanite was produced in 1987 by only one company in the United States, Kyanite Mining Corp. of Dillwyn, VA. US producers of synthetic mullite were C-E Minerals Inc., Americus, GA; Didier Taylor Refractories Corp., Greenup, KY; and Electro Minerals US Inc., Niagara Falls, NY.

Although data were not available, production of kyanite and synthetic mullite was estimated to have decreased compared with that of 1986. Reasons for this include competition from a new kyanite producer in Sweden and the closing in late 1986 of the only other domestic kyanite producer, Pasco Mining Inc., in Washington, GA.

Kyanite, both raw and calcined, was marketed in sizes ranging from 500 to 45 μm (35 to 325 mesh). End uses were in monolithic refractory applications, such as high temperature mortars or cements, ramming mixes, and castable refractories, or with clays and other ingredients in refractory compositions for items such as kiln furniture. More finely ground material was used in body mixes for sanitary porcelains and wall tile.

Although data were not available, it was estimated that 90% of kyanite-synthetic mullite output was used in refractories: 55% for smelting and processing iron and steel, 20% for nonferrous metals, and 15% for glassmaking and ceramics. Nonrefractory uses accounted for the balance.

Small, but apparently growing tonnages of andalusite from the Republic of South Africa, have been imported into the United States in recent years. Due to its larger particle size, the mineral is used in refractory brick. Import data for andalusite, obtained from nongovernment sources, were estimated at 2.7 kt (3000 st) in 1985, 4.5 kt (5000 st) in 1986, and 12.7 kt (14,000 st) in 1987.

The Republic of South Africa has been the world's largest producer of andalusite. Output was estimated at 180 kt (198,000 st) in 1987. In France, output of andalusite in 1987 was an estimated 51 kt (56,000 st). India produced an estimated 30 kt (33,000 st) of kyanite and 14.5 kt (16,000 st) of sillimanite in 1987, mostly for internal consumption. In 1985, Sweden began producing kyanite. Initial output was estimated to be in the 4.5 to 9 kt/a (5000 to 10,000 stpy) range. ■

Lime

K.A. Gutschick,
National Lime Association

Preliminary figures from the US Bureau of Mines indicates that total lime output in 1987 gained 7%. The 14 Mt (15 million st) produced includes 83% of commercial lime. The balance is captive lime.

This 7% increase was due largely to the ending of the seven-month long strike in early 1987 of lime's biggest customer—steel. This was followed by the steel industry operating at 80% to 90% capacity for the balance of the year.

However, in spite of this modest increase, 1987 could still be considered a relatively poor year compared to the 1970's. Then, annual output topped 18 million Mt (20 million st), or 25% above last year's performance.

The limited data for 1987, according to the Bureau, showed that all of the gains occurred in the chemical and industrial sector, which was up 7% over 1986.